

Image Interpolation

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### Image Interpolation 图像内插

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August 15, 2016



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### **Brief Introduction**

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Image interpolation is a method of constructing new data points within the range of a discrete set of known data points.

#### Functions:

- Scaling
- Rotate
- Geometric Correction



## Relarge Images

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The purpose of enlarging image (upsamplin / interpolating) is to enlarge the original image so that it can be displayed on a higher -resolution display device.





## Classification

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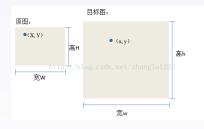
Theory Code

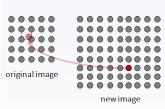
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## Nearest neighbor interpolation

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# $1.f(x,y) \approx f(0,0)(1-x)(1-y) + f(1,0)x(1-y) + f(0,1)(1-x)y + f(1,1)xy$

$$2. \ v(x,y) = ax + by + cxy + d$$

### Coefficients:

- = a=f(1,0)-f(0,0)
- b=f(0,1)-f(0,0)
- c = f(1,1)-f(0,1)-f(1,0)+f(0,0)
- d=f(0,0)



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## $f(x, y) = \sum_{i=0}^{3} \sum_{j=0}^{3} a_{ij} x^{i} y^{j}$

The value of the coefficients  $a_{ij}$  depends on the characteristic of the interpolation data.

As for each dot of each unit, we have to drag the coordinates (0,0), (1,0), (0,1) and (1,1) into the 16 equations to get the results.



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### 1. Completeness:

Bicubic interpolation > Bilinear interpolation > Nearest neighbor interpolation

### 2. Difficulty:

Bicubic interpolation > Bilinear interpolation > Nearest neighbor interpolation

ightarrow Bilinear interpolation satisfies the needs of most relarged images without complex arthmetic.